

## CLAIMS

1. A PCB decomposition reactor comprising a reaction vessel for decomposing PCB therein and a cyclone separator disposed in flow communication with an outlet of said reaction vessel for separating sodium carbonate particles from the reaction fluid withdrawn through said outlet, wherein said outlet is formed in the sidewall of said reaction vessel.

2. A PCB decomposition reactor as claimed in claim 1 wherein a nozzle for introducing air in order to agitate the reaction fluid within said reaction vessel is connected to the bottom of said reaction vessel.

3. A PCB decomposition reactor as claimed in claim 1 wherein a nozzle for introducing oxygen in order to agitate the reaction fluid within said reaction vessel is connected to the bottom of said reaction vessel.

4. A PCB decomposition reactor as claimed in claim 1 wherein a nozzle for introducing air and oxygen in order to agitate the reaction fluid within said reaction vessel is connected to the bottom of said reaction vessel.

5. A PCB decomposition reactor comprising a reaction vessel for decomposing PCB therein and a cyclone separator disposed in flow communication with an outlet of said reaction vessel for separating sodium carbonate particles from the reaction fluid withdrawn through said

outlet, wherein said reaction vessel is equipped with an injector for injecting water and sodium hydroxide from the outside to the inside of said reaction vessel, and a pipe connected to the suction chamber of said injector for  
5 introducing the sodium carbonate particles separated by said cyclone separator into said suction chamber.

6. A PCB decomposition reactor as claimed in claim 5 wherein a nozzle for introducing air in order to agitate the reaction fluid within said reaction vessel is connected to the bottom of said reaction vessel.  
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7. A PCB decomposition reactor as claimed in claim 5 wherein a nozzle for introducing oxygen in order to agitate the reaction fluid within said reaction vessel is connected to the bottom of said reaction vessel.

8. A PCB decomposition reactor as claimed in claim 5 wherein a nozzle for introducing air and oxygen in order to agitate the reaction fluid within said reaction vessel is connected to the bottom of said reaction vessel.  
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9. A PCB decomposition reactor comprising a  
20 reaction vessel for decomposing PCB therein and a feed pipe for feeding PCB and a solvent therefor to said reaction vessel, wherein an injector for injecting water and sodium hydroxide from the outside to the inside of said reaction vessel is connected to said reaction vessel, and said feed  
25 pipe is connected to the flow path between the connected end

of said injector and the suction port of said injector for supplying water and sodium hydroxide therethrough.

10. A PCB decomposition reactor as claimed in claim 9 wherein a nozzle for introducing air in order to  
5 agitate the reaction fluid within said reaction vessel is connected to the bottom of said reaction vessel.

11. A PCB decomposition reactor as claimed in claim 9 wherein a nozzle for introducing oxygen in order to  
10 agitate the reaction fluid within said reaction vessel is connected to the bottom of said reaction vessel.

12. A PCB decomposition reactor as claimed in claim 9 wherein a nozzle for introducing air and oxygen in order to agitate the reaction fluid within said reaction vessel is connected to the bottom of said reaction vessel.

13. A PCB decomposition reactor comprising a reaction vessel for decomposing PCB therein with the aid of sodium carbonate, wherein the molar amount of sodium  
15 hydroxide supplied to said reaction vessel in order to form sodium carbonate is controlled so as to fall within a range  
20 which does not cause any excess sodium carbonate to precipitate.

14. A PCB decomposition reactor as claimed in claim 13 wherein a nozzle for introducing air in order to  
25 agitate the reaction fluid within said reaction vessel is connected to the bottom of said reaction vessel.

15. A PCB decomposition reactor as claimed in claim 13 wherein a nozzle for introducing oxygen in order to agitate the reaction fluid within said reaction vessel is connected to the bottom of said reaction vessel.

5            16. A PCB decomposition reactor as claimed in claim 13 wherein a nozzle for introducing air and oxygen in order to agitate the reaction fluid within said reaction vessel is connected to the bottom of said reaction vessel.